DOCUMENT RESUME

ED 190 674 TM 800 489

AUTHOR Coffman, William E.; Olsen, Scott A.
TITLE The First Two Years of PLAN: An Evaluation of Program Impact.
INSTITUTION Iowa Testing Programs, Iowa City.
REPORT NO ITP-OP-26
PUB DATE Jun 80
NOTE 29p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; *Comparative Analysis; *Compensatory Education; Computer Managed Instruction; Elementary School Mathematics; Individualized Instruction; Intermediate Grades; *Programed Instruction; *Program Evaluation; Reading Achievement; Scaling
IDENTIFIERS *Diagonal Linear Adjustment; New Orleans Public Schools LA; *Programmed Learning in Accordance with Needs

ABSTRACT

Measures of achievement in reading and mathematics following implementation of different curricular programs for disadvantaged pupils in the New Orleans system are compared. Programs implemented in Grades 4 through 7 include: (1) no compensatory programs; (2) traditional compensatory programs; (3) PLAN (Programmed Learning in Accordance with Needs) as a compensatory program. Pupils in each group were administered the Comprehensive Tests of Basic Skills during March of the years 1976, 1977 and 1978. A comparison of the program revealed that (1) both compensatory programs produce achievement scores as high as or higher than those produced by the schools without compensatory programs for pupils of the same initial achievement; (2) pupils of initial ability above the average for compensatory eligibility programs do unusually well when PLAN is begun early in their school careers; (3) the effect of the PLAN type program appears to be cumulative in mathematics with pupils of lower ability; (4) pupils in compensatory programs may fall back in mathematics during seventh grade. Relevant tables and graphs are appended. (RL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED190674

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

IOWA TESTING PROGRAMS OCCASIONAL PAPERS

Number 26 - June 1980

The First Two Years of PLAN*

An Evaluation of Program Impact

William E. Coffman

and

Scott A. Olsen

The University of Iowa

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
S. Olsen
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TM800489

THE FIRST TWO YEARS OF PLAN*

AN EVALUATION OF PROGRAM IMPACT

Executive Summary

In the fall of 1976 New Orleans introduced into grades four, five, and six of fifteen elementary schools eligible for Title I funds a computer managed educational program commonly referred to as PLAN* (Programmed Learning in Accordance with Needs). This program, available from the Westinghouse Learning Corporation, is essentially a program of individualized instruction with an accompanying computer based management system. In the fall of 1977 PLAN* was put into effect in the same grade levels in an additional twelve schools receiving ESAA funds. In New Orleans PLAN* is used in all of these schools as a compensatory educational program aimed at helping disadvantaged pupils. More traditional compensatory programs are operating in other New Orleans schools, generally through programs that provide special instruction in reading and/or mathematics for pupils judged to have special needs. In addition, there are a number of schools in the New Orleans System that operate no special compensatory programs.

The purpose of this study was to compare measures of achievement in reading and in mathematics for pupils in schools following these different curricular patterns. The data used for the study are the Total Mathematics Expanded Standard Scores (TME) obtained from the yearly district-wide administration of the Comprehensive Tests of Basic Skills (CTBS) during March of the years 1976, 1977 and 1978. The Expanded Standard Scores provide a continuous scale of achievement

along which one can mark the progress of children as they move from grade to grade through the school system.

Three groups of pupils were studied: those in Grade 3 were tested in the spring of 1976, in Grade 4 in 1977, and in Grade 5 in 1978 (Cohort 3); those tested in Grades 4, 5, and 6 (Cohort 4); and those tested in Grades 5, 6, and 7 (Cohort 5). Within each cohort, schools were grouped according to instructional programs, and details of results for the different program groups and for individual schools within program groups are provided in the complete report of the study. For this executive summary, results are summarized for three different program groups within each of the three cohorts as follows:

Cohort 3 - Program 00 (pupils in 23 schools without special compensatory programs)
Program 11 (pupils in 34 schools with compensatory programs but not PLAN*)
Program 22 (pupils in 12 PLAN* schools both years)

Cohort 4 - Program 00 (pupils in 22 schools without special compensatory programs)
Program 11 (pupils in 32 schools with compensatory programs but not PLAN*)
Program 22 (pupils in 9 PLAN* schools both years)

Cohort 5 - Program 00 (pupils in 30 schools without special compensatory programs)
Program 11 (pupils in 36 schools with compensatory programs but not PLAN*)
Program 12 (pupils in 13 PLAN* schools during grade 6 and in a junior high school with a non-PLAN* compensatory program in grade 7)

It must be recognized that the manner of assigning programs to

schools insures that test results would be expected to be different for the different program groups. Since assignment was on the basis of judged need it would be expected that on the average pupils in schools with compensatory programs would be expected to score lower on tests of achievement than pupils in schools without compensatory programs, at least at the time of initial testing. That's why compensatory programs were provided in the first place. What we need is to find some way of deciding what is a reasonable expectation for each group when we know the groups are not equal in achievement at the time of the first testing. One way of doing this is to ask how the performance in schools having compensatory programs compare with that found for schools without compensatory programs after making allowances for differences at the time of initial testing.

The particular methodology used to compare programs shall be referred to as diagonal linear adjustment. Campbell and Boruch (1975) and Kenne (1975) demonstrate that this method has several technical advantages over related approaches for conditions like those existing in this study. Essentially, the method is to fit a straight line through the points in a two-way plot that represents the pretest and the posttest scores of pupils in a group under study. Such a line pictures the general relationship between the pretest and the posttest measures and indicates how, on the average, particular scores below or above the average pretest scores are related to particular scores the same relative distance above and below the average posttest score.

The graphs can be easily constructed by calculating three points

and connecting them with a straight line. The center point corresponds to the pretest and posttest means (average scores). The lower point corresponds to values, two standard deviations below the mean for both pretest and posttest. Similarly the upper point on the coordinate system corresponds to values, two standard deviations above both the pretest and posttest means. These points should always connect to form a straight line which may be considered as descriptive of the general relationship between pretest and posttest scores over the range in which most of the data exists.

The basic data for constructing the diagonal lines (means, standard deviations, and end points) for Program Groups 00, 11, and 22 for Cohort 3 pupils in this study are shown in Table 1. Those for Cohort 4 and Cohort 5 are shown in Tables 2 and 3 respectively. The comparison lines for corresponding tests (reading and mathematics) and for the several cohorts are shown in Figures 1 through 12. The odd numbered figures show the relationships over one year, (1976 to 1977) and the even numbered figures show the relationships over two years, (1976 through 1978).

In considering the figures, it should be remembered that each line is based on data from a number of different schools and that factors such as differences in teacher experience, in pupil levels of development, in home and neighborhood characteristics, and in relative emphasis given to reading and mathematics in relation to other subjects of the school curriculum may be as influential as a particular curriculum emphasis in determining the learning that

occurs in a school or in a program group. Such factors may differ from school to school, from year to year, and from cohort to cohort. Also, the actual data may be fitted more closely by a curved line then by a straight line so that the straight line may not tell the whole story. For a complete understanding of the results, it is desirable to study the detailed data provided in the complete report. Thus, each particular figure should be considered but a single snapshot of what is going on in the New Orleans school system over the period indicated. As additional data becomes available from the testing in 1979 and in future years, and as the results for a particular instance are placed in the larger context of all that is known about the school system, one will become better able to put any one of these snapshots in perspective.

Reading Achievement

The lines showing the relationships between reading test scores for Cohort 3 over the one-year period between spring 76 and spring 77 are shown in Figure 1. If we consider the line for the group with no special compensatory program (Program Group 00) as the basis for making comparisons, the performance of the Title I non-PLAN* group (Program Group 11) is generally below that of the comparison group. In contrast, the average performance of the PLAN* group (Program Group 22) is right on the diagonal line for the comparison group. That is on the average, the PLAN group appears to be performing in a manner equal to pupils of the same ability in the comparison group. On the other hand, there appears to be a tendency for PLAN pupils

above the PLAN group average to do better than the comparson group while those below average appear to be doing less well than similar pupils in either the comparison group or in the non-PLAN* group. As can be seen from Figure 2, at the end of two years the trends noted in Figure 1 have continued. The average pupil in the Title I non-PLAN* group (Program Group 11) is performing almost as well as comparable pupils in the comparison group, and the same trend is found throughout the range of achievement of pupils in the group. There has been further relative gains for the PLAN* group which now is higher than either of the other groups except at the extreme lower end of the score range. Here the differences cannot be considered significant. In fact, when the detailed data are examined, one finds that there is a slight curving of the best lines of relationship so that as the extreme lower end of the distribution the Project PLAN group is doing slightly better than the other groups. (See Table B-1 of the original report).

The general trends in reading achievement noted for Cohort 3 are not repeated for Cohort 4 (Figures 3 and 4). At the end of the first year there is little difference among the three lines for the groups under study. The PLAN group is certainly achieving as well as the comparison group, and there may be a slight tendency for the Title I program to be more successful than the comparison group with below average pupils. At the end of two years (Figure 4) the Title I group is still performing as well as or perhaps even a little better

than the comparison group. In contrast, the PLAN group is performing below the comparison group throughout the range of ability although there is essentially no difference for pupils at the lower end of the ability range.

An explanation of this lower performance during the second year of PLAN* for Cohort 4 is not immediately apparent, and the data should be studied in greater detail by those already well informed about the school system in an effort to find an explanation.

The results at the end of the first year for Cohort 5 (Figure 5) are clearly favorable to the two compensatory programs. The Title I non-PLAN schools appear to be producing better reading comprehension than the schools without compensatory programs throughout most of the range of ability and doing as well at the lower end of the ability range. The Project PLAN schools appear to be doing equally well on the average with perhaps a slight tendency to be more successful with pupils of higher ability. The picture is essentially the same for the Title I Program Group at the end of two years; however, there has been a slight loss of relative standing for the PLAN Group. Recall, however, that there was no PLAN program during the second year for these pupils, who were in seventh grade.

Mathematics Achievement

At the end of one year for Cohort 3, the mathematics achievement for the PLAN group (Program Group 22) was on the average equal to that of the comparison group (Program Group 00) with perhaps a little tendency for relatively greater achievement for pupils with high scores

on the initial test (Figure 7). In contrast, the Title I Group (Program Group 11) was generally a few points lower than the comparison group throughout the range of initial test scores. By the end of two years, however, the PLAN group was superior throughout the score range and the Title I group was equal in achievement to the comparison group with perhaps a slight tendency for higher achievement near the lower end of the score range. (Figure 8).

Figures 9 and 10 show the mean (average) mathematic scores and the diagonal lines for the three groups in Cohort 4 at the end of one and of two years. By the end of one year both compensatory programs are producing results comparable to those of the comparison group, and the Title I group is clearly above the comparison group at the lower end of the range while the PLAN group is clearly above the comparison group at the upper end of the range. At the end of two years the PLAN group is performing essentially the same as the comparison group while the Title I group is showing greater achievement throughout the range of achievement represented in the group.

Figures 11 and 12 show the lines of relationship and the mean mathematics scores for Cohort 5. At the end of the first year (Figure 11) both compensatory groups are achieving generally above the comparison group except at the extreme lower end of the ability range, and there is a slight advantage of the Title I program over PLAN. By the end of the second year, however, there is essentially no difference between the Title I group and the comparison group while the PLAN group is generally slightly below the comparison group. It should

be noted, however, that the PLAN group was not enrolled in a PLAN program during the second year; rather, pupils were enrolled in junior high schools most of which were operating the more traditional Title I compensatory programs.

Summary

It is not easy to summarize in any definite way the results reported here. The picture is not the same from cohort to cohort or from subject to subject. There does seem to be a generally favorable finding in that both of the compensatory programs are in most cases producing achievement scores as high as or higher than those produced by the schools without compensatory programs for pupils of the same initial achievement. Furthermore, pupils of initial ability above the average for these schools eligible for compensatory programs appear to do unusually well under Project PLAN when PLAN is begun early in their school careers (Cohort 3). There appears to be a cumulative effect of the Title I type program, particularly in mathematics with pupils of lower ability. It may be that the introduction of Project PLAN initially in an upper grade with pupils already familiar with a more traditional compensatory program may present special adjustment problems.

There is one final observation that is not emphasized by the figures but which can be seen in Table 3. That is the fact that pupils in the compensatory programs fail to make much progress or even fall back in mathematics during the seventh grade. The change

in the relative positions of the diagonal lines from Figure 11 to Figure 12 results primarily from the fact that the comparison group pupils did make some small gain while the compensatory group pupils actually showed a decline in achievement. It is not immediately clear whether this can be thought of as a result of intensive coaching in preparation for the 1977 tests, to some scaling problem between levels of the tests used in grade six and in grade seven, or to some lack of correspondence between the instruction in the junior high schools and the needs of these particular pupils. This is a problem that should receive the attention of those responsible for guiding the educational program, in the junior high schools of the New Orleans School System.

References

1. Campbell, D.T. & Boruch, R.F. Making a case for randomized assignment to treatments by considering the alternatives: Six ways in which quasi-experimental evaluations in compensatory education tend to underestimate effects. In Bennett, C.A. & Lumsdaine, A.A. (Eds.) Evaluation and experiment: Some critical issues in assessing social programs. New York: Academic Press, 1975, pp. 195-296.

2. Kenney, D.A. A quasi-experimental approach to assessing treatment effects in the non-equivalent control group design. Psychological Bulletin, 1975, 82, 345-362.

TABLE 1

Descriptive Data for Program Groups

New Orleans School System

Cohort 3

Subject	Program	Year	Mean	(gain)	S.D.	Low End	(gain)	High End	(gain)
Reading	00	76	369		73	223		515	
		77	418	(49)	84	250	(27)	586	(71)
		78	446	(28)	85	276	(26)	616	(30)
	11	76	323		56	211		435	
		77	355	(32)	62	231	(20)	479	(44)
		78	388	(33)	67	254	(23)	522	(43)
	22	76	314		50	214		414	
		77	354	(40)	69	216	(2)	492	(78)
		78	387	(33)	73	241	(25)	533	(41)
Mathematics	00	76	352		53	246		458	
		77	397	(45)	58	281	(35)	513	(55)
		78	431	(34)	69	293	(12)	569	(56)
	11	76	320		43	234		406	
		77	354	(34)	47	260	(26)	448	
		78	391	(37)	52	287	(27)	495	
	22	76	312		42	228		396	
		77	354	(42)	50	254	(26)	454	(58)
		78	392	(38)	60	272	(18)	512	(58)

TABLE 2

Discriptive Data for Program Groups

New Orleans School System

Cohort 4

Subject	Program	Year	Mean	(gain)	S.D.	Low End	(gain)	High End	(gain)
Reading	00	76	405		79	247		563	
		77	449	(44)	87	275	(28)	623	(60)
		78	484	(35)	90	304	(29)	664	(41)
	11	76	351		64	223		479	
		77	391	(40)	66	259	(36)	523	(44)
		78	425	(34)	78	269	(10)	581	(58)
	22	76	348		70	208		488	
		77	388	(40)	76	236	(28)	540	(42)
		78	411	(23)	76	259	(23)	563	(23)
Mathematics	00	76	386		70	278		494	
		77	429	(43)	76	291	(13)	567	(73)
		78	470	(41)	76	326	(35)	614	(47)
	11	76	345		47	251		439	
		77	385	(40)	54	277	(26)	493	(54)
		78	428	(43)	60	308	(31)	548	(55)
	12	76	352		46	260		444	
		77	390	(38)	61	268	(08)	512	(68)
		78	423	(33)	63	297	(29)	549	(37)

TABLE 3

Descriptive Data for Program Groups, New Orleans School System

Cohort 5

Subject	Program	Year	Mean	(gain)	S.D.	Low End	(gain)	High End	(gain)
Reading	00	76	424		86	252		596	
		77	467	(43)	90	287	(35)	647	(51)
		78	493	(26)	94	305	(18)	681	(34)
	11	76	376		68	240		512	
		77	430	(54)	83	264	(24)	596	(84)
		78	452	(22)	80	292	(28)	612	(16)
	22	76	368		67	234		502	
		77	410	(42)	77	256	(22)	564	(62)
		78	428	(18)	69	290	(34)	566	(02)
Mathematics	00	76	407		67	273		541	
		77	456	(49)	73	310	(37)	602	(61)
		78	468	(12)	82	304	(-6)	632	(30)
	11	76	370		54	262		478	
		77	426	(56)	64	298	(36)	554	(76)
		78	421	(-5)	67	287	(-11)	555	(1)
	22	76	369		53	263		475	
		77	420	(51)	62	296	(33)	544	(69)
		78	411	(-9)	65	281	(-15)	541	(-3)

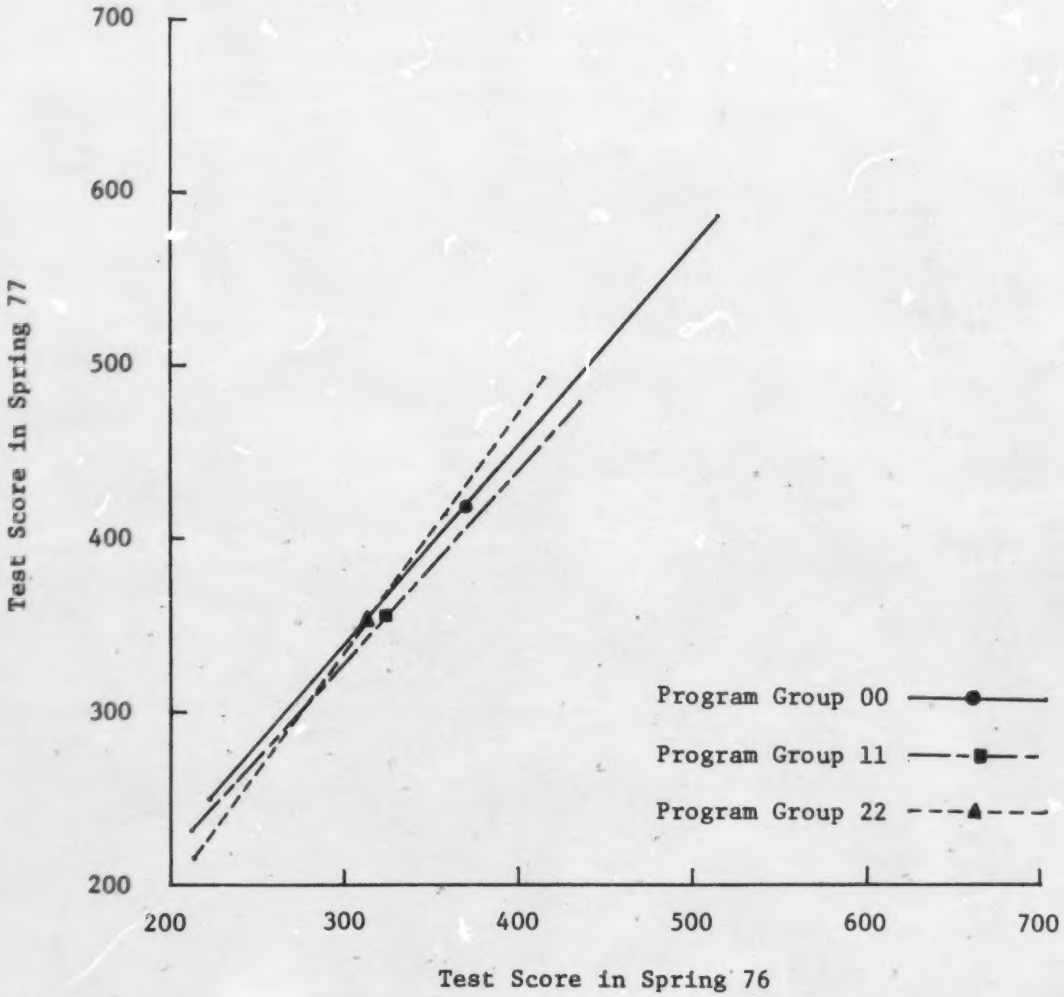

Figure 1. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 3 after One Year

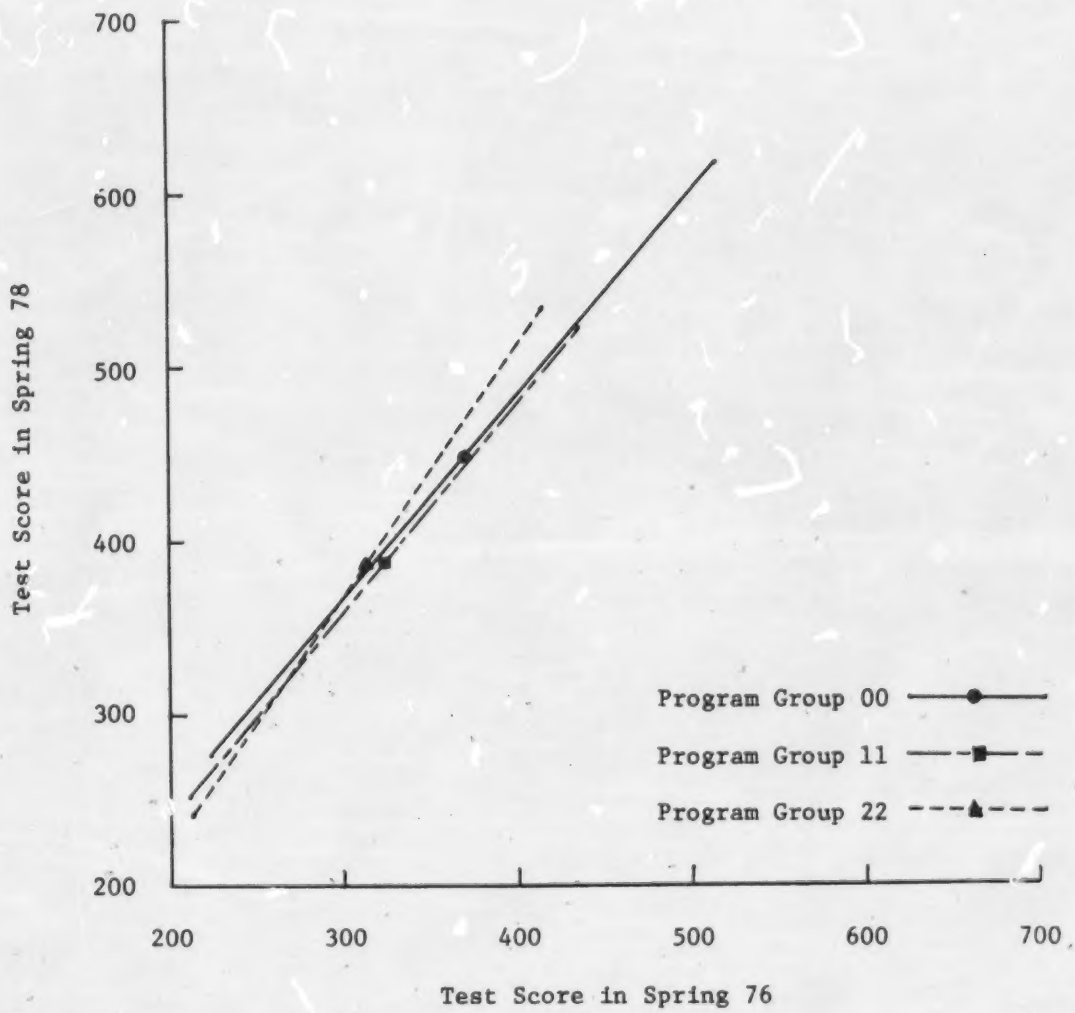

Figure 2. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 3 after Two Years

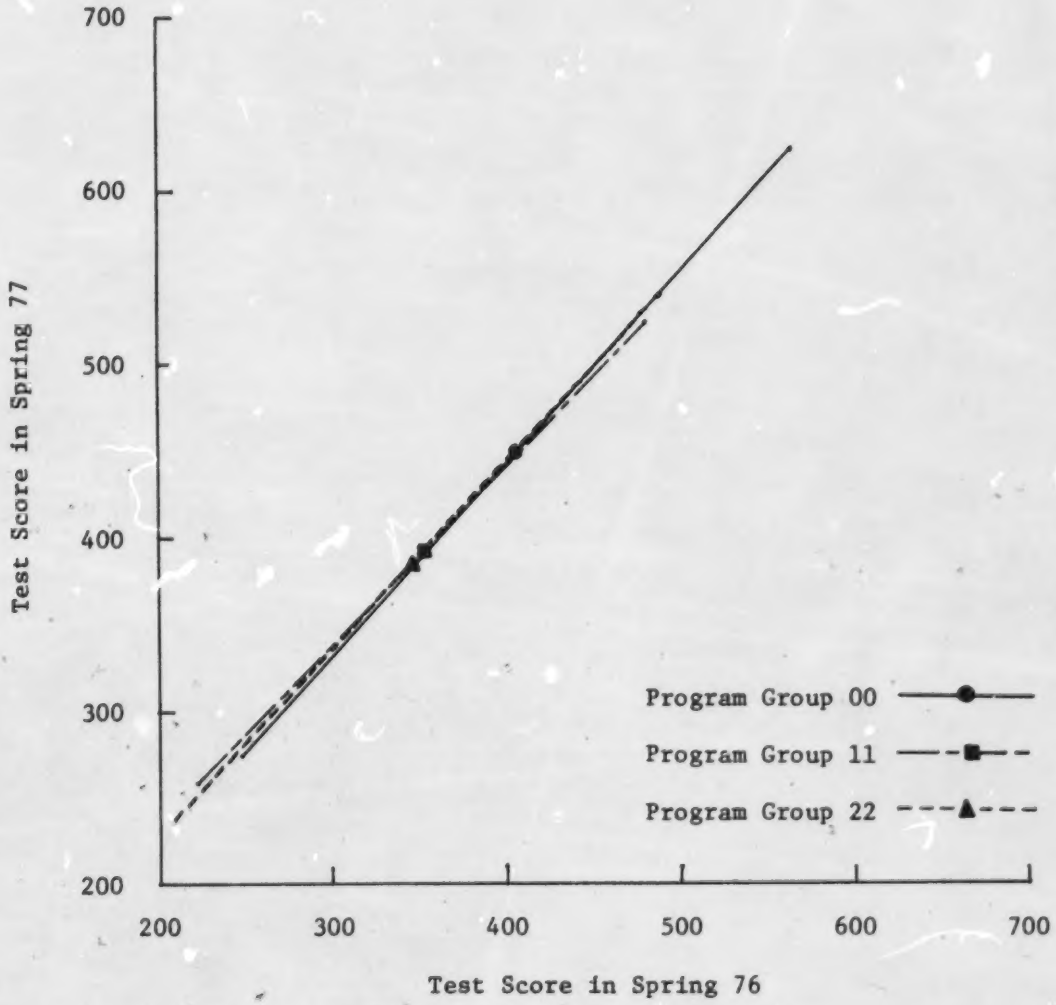

Figure 3. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 4 after One Year

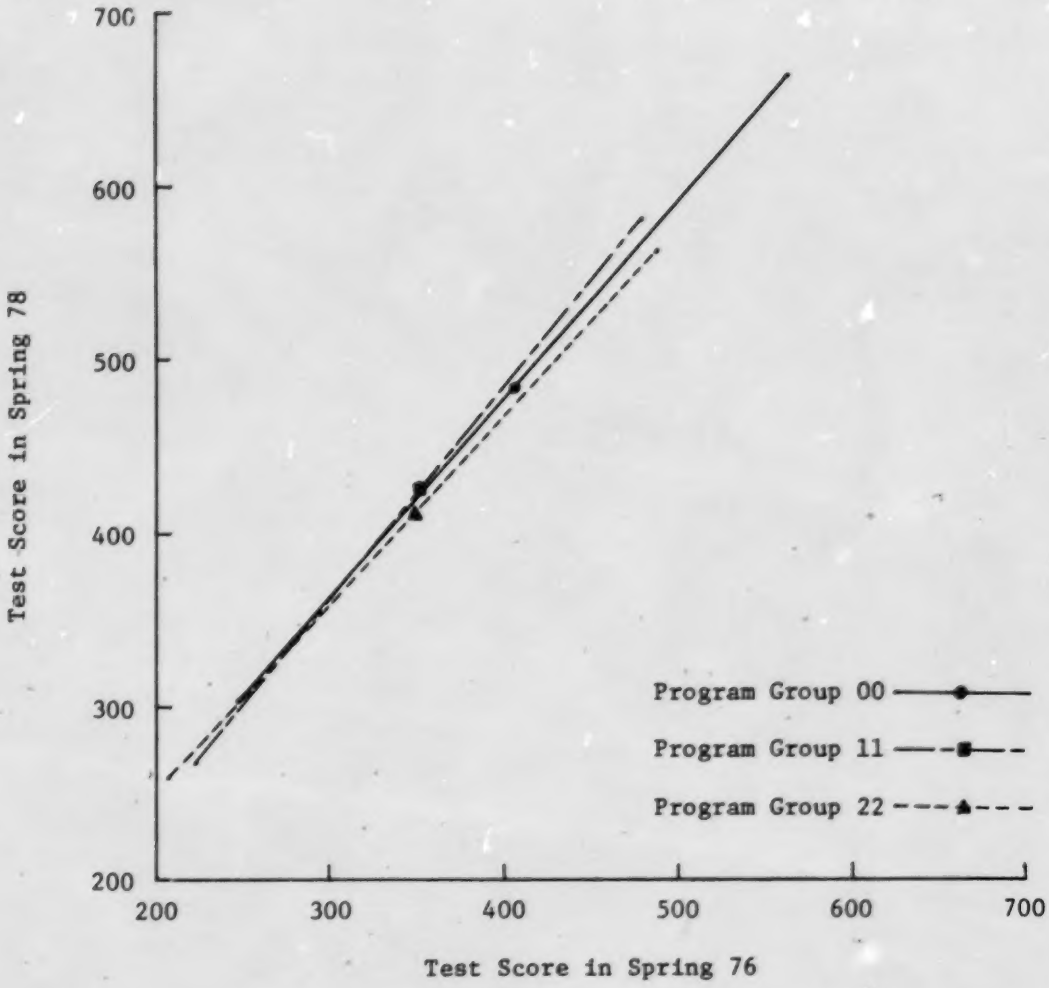

Figure 4. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 4 after Two Years

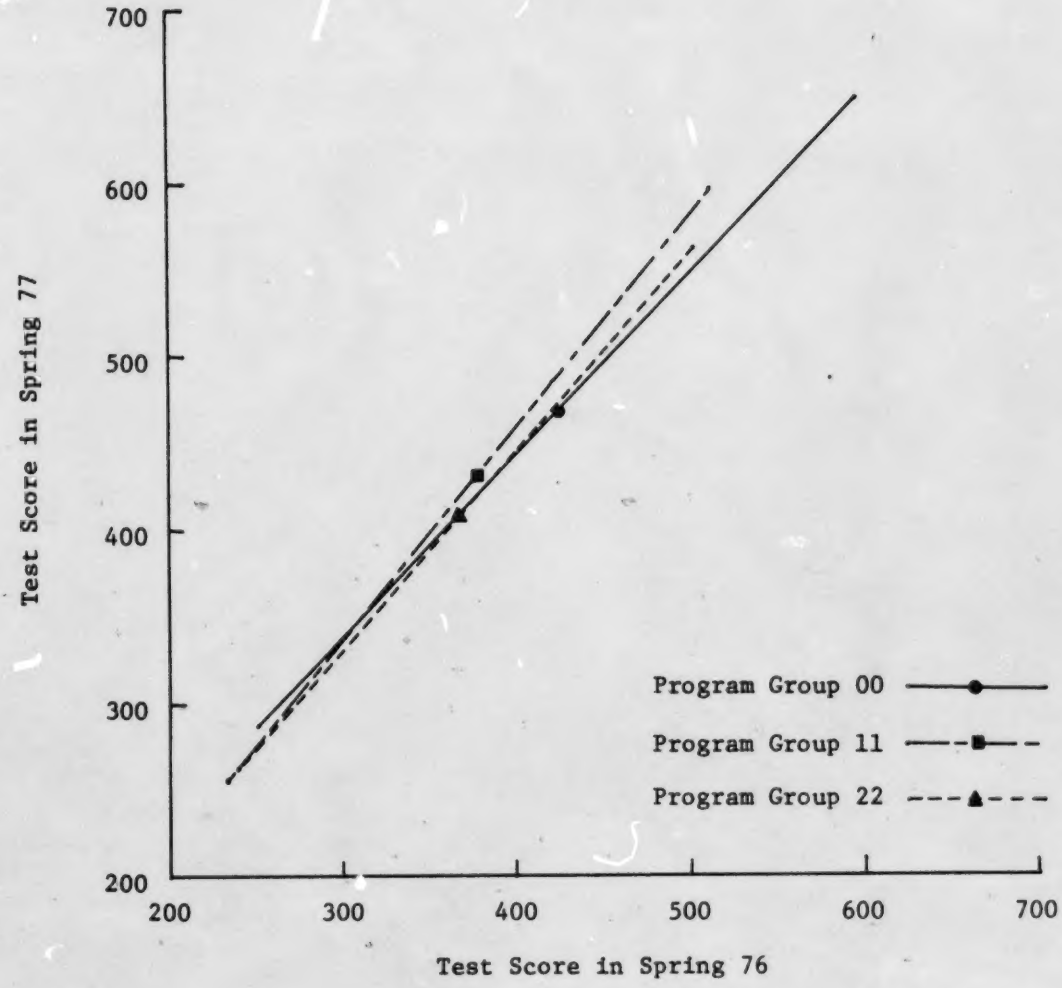

Figure 5. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 5 after One Year

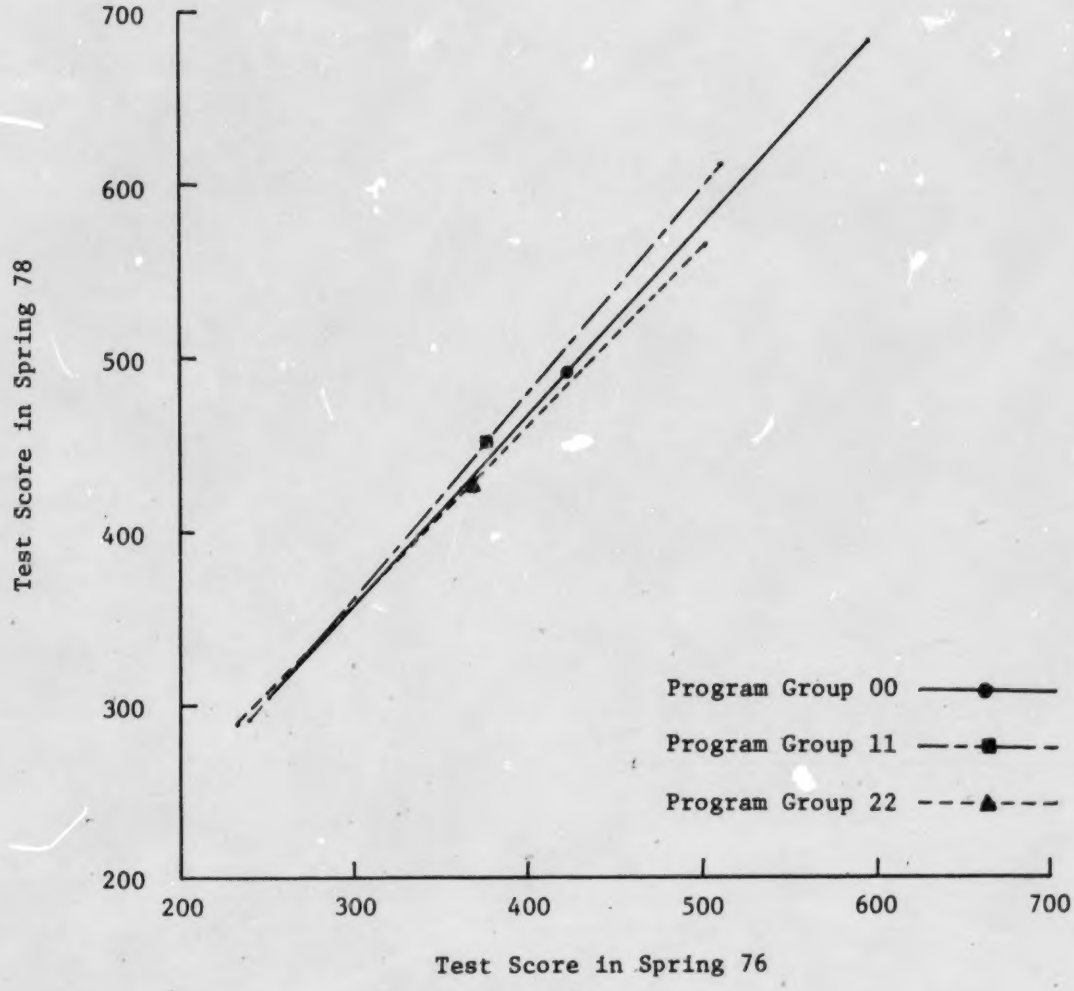

Figure 6. Diagonal Lines and Mean Reading Scores for Three Program Groups in Cohort 5 after Two Years

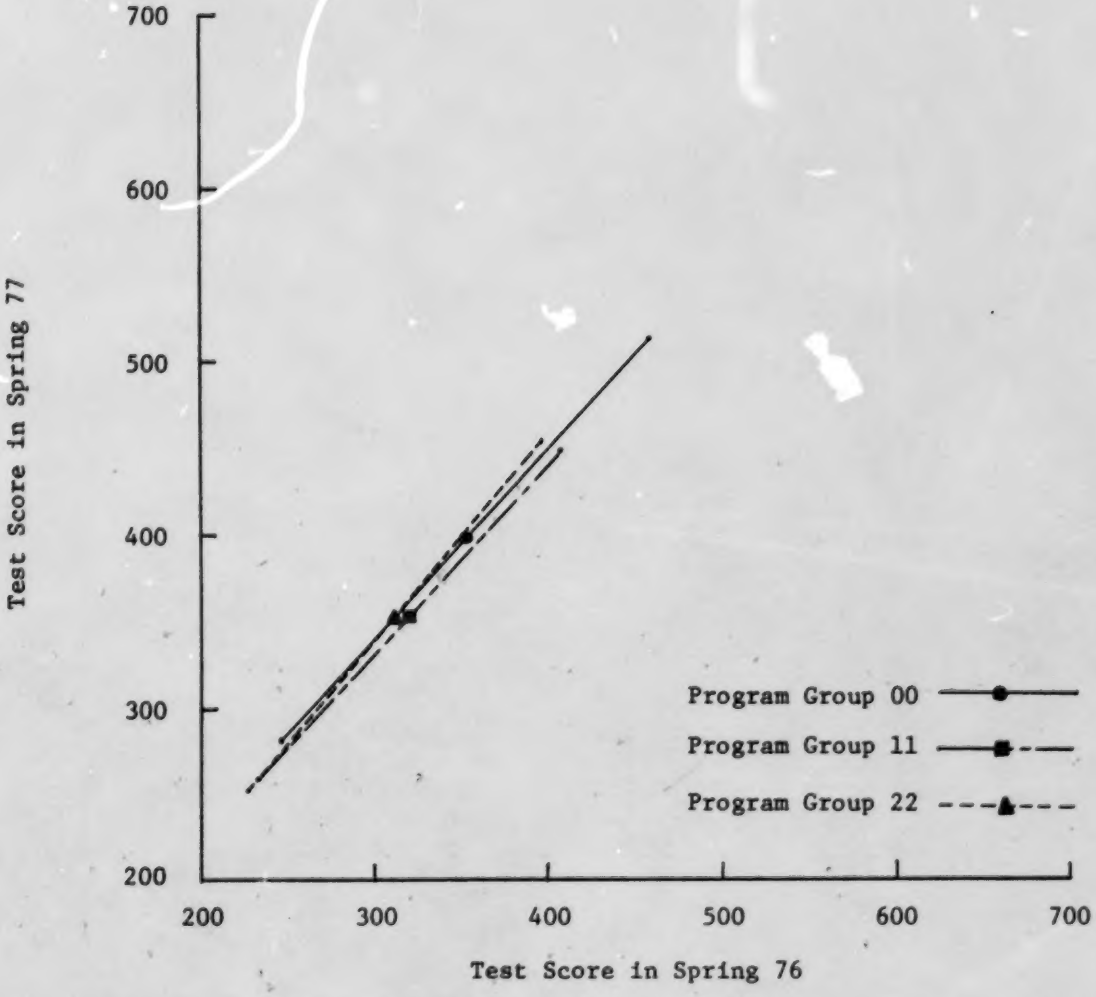

Figure 7. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 3 after One Year

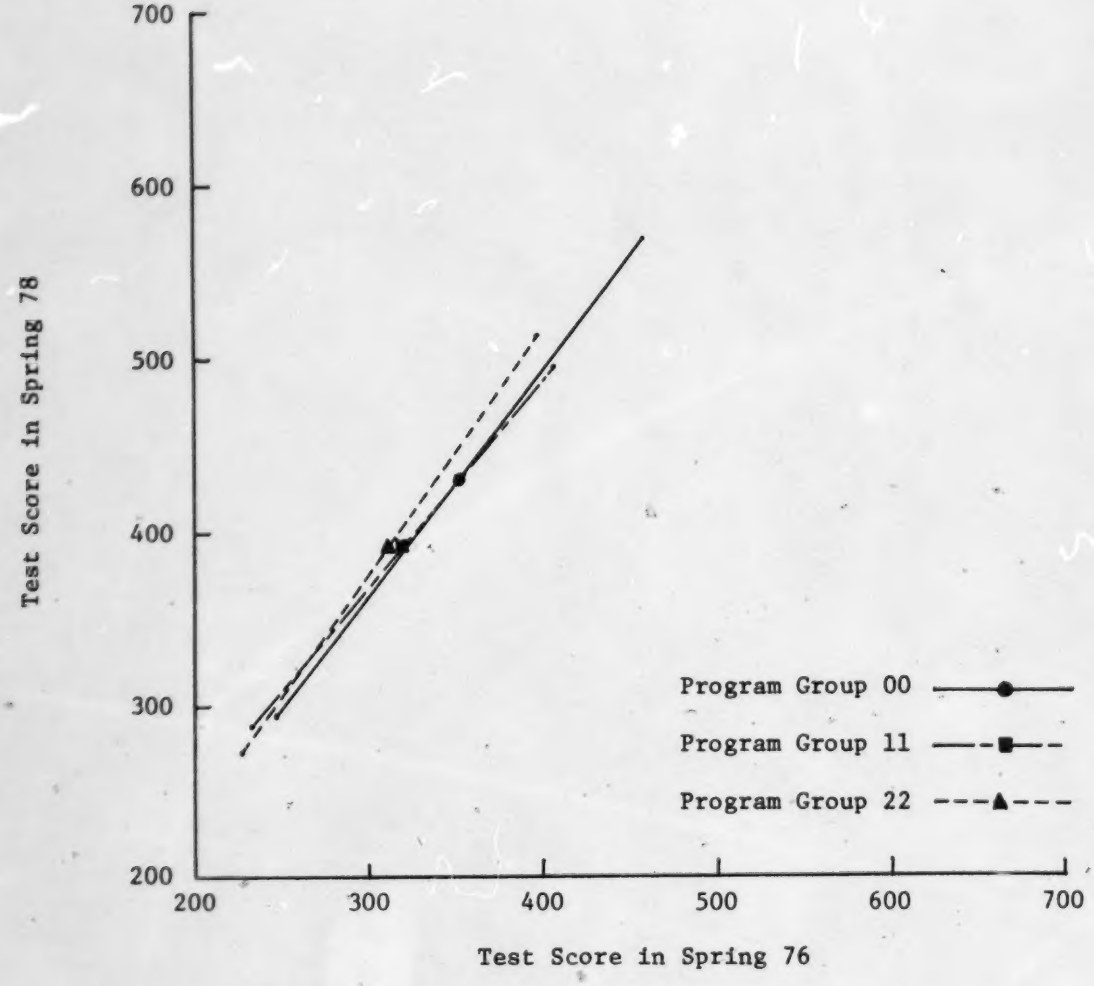

Figure 8. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 3 after Two Years

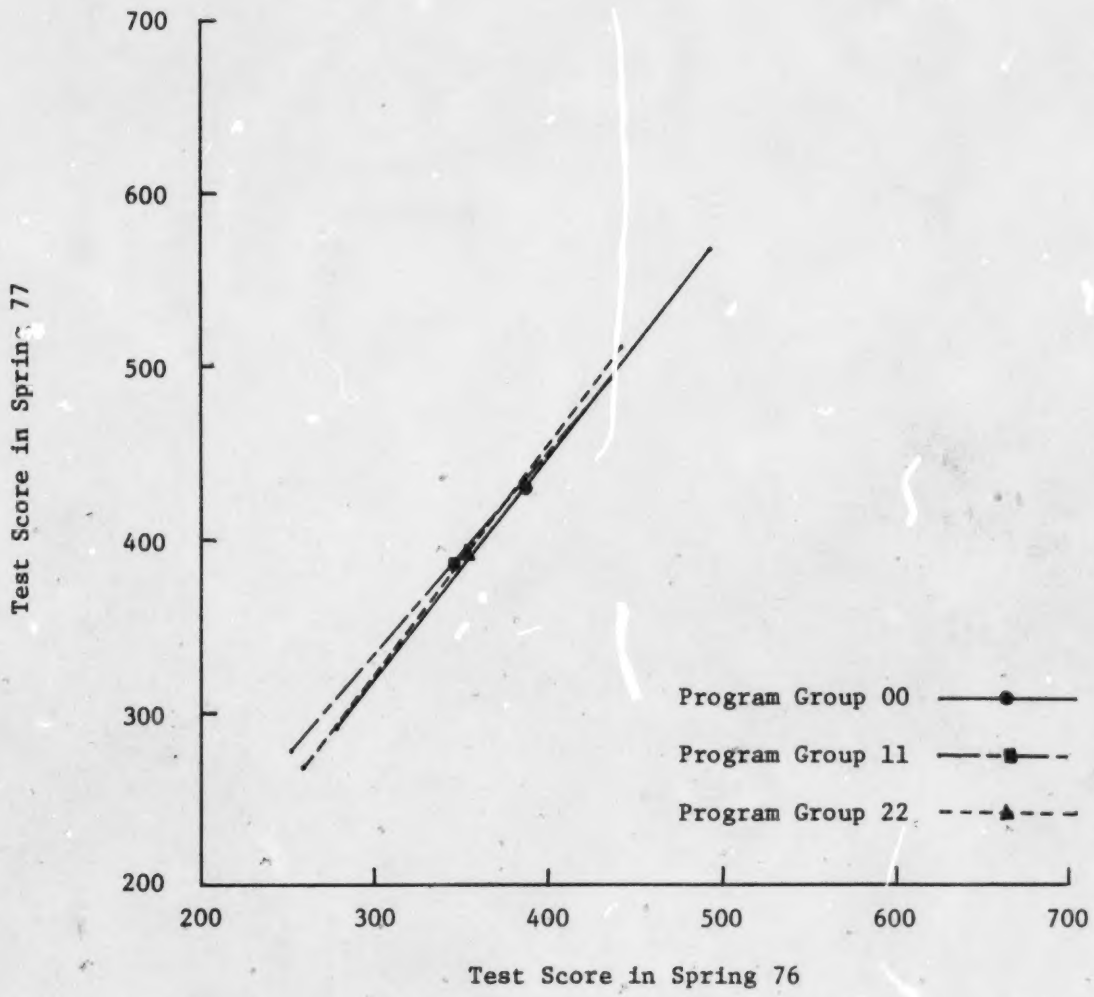

Figure 9. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 4 after One Year

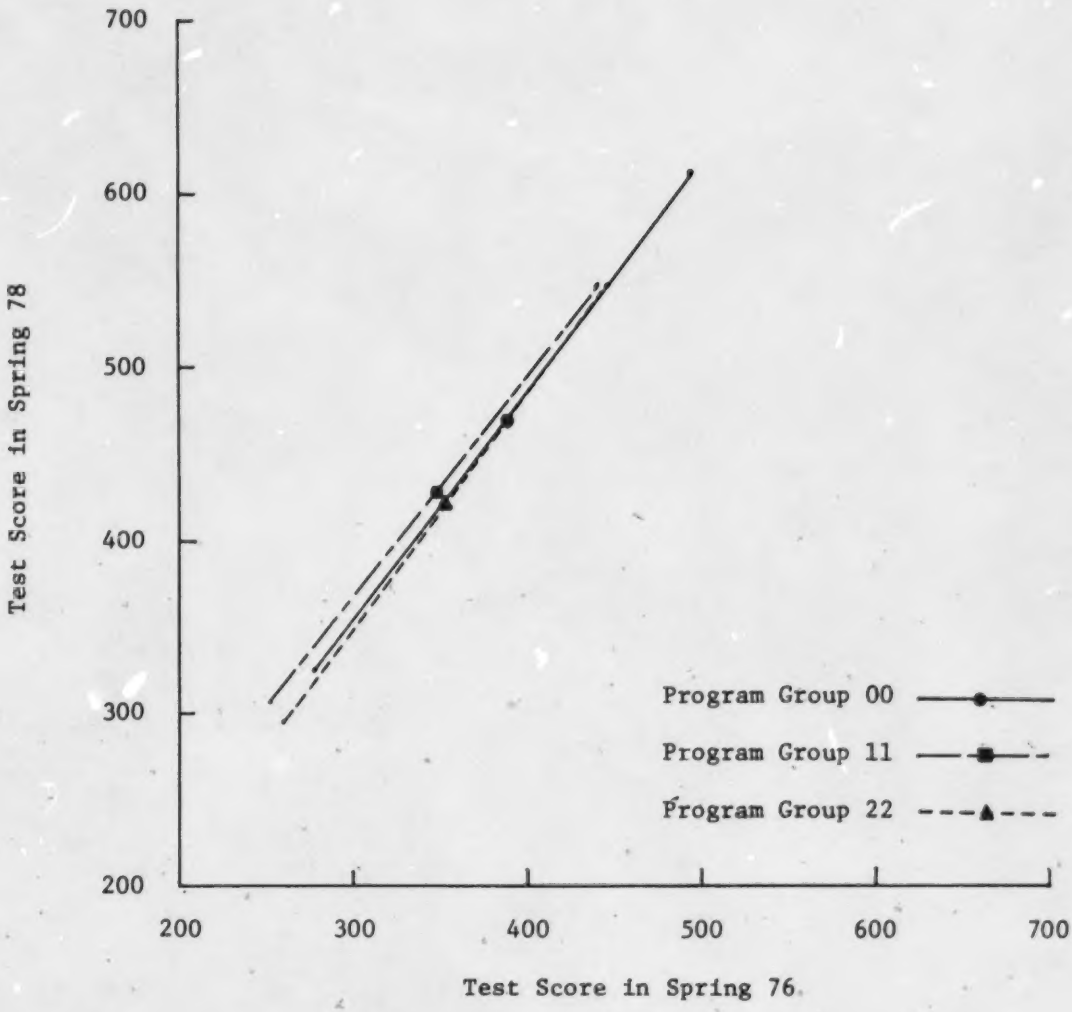

Figure 10. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 4 after Two Years

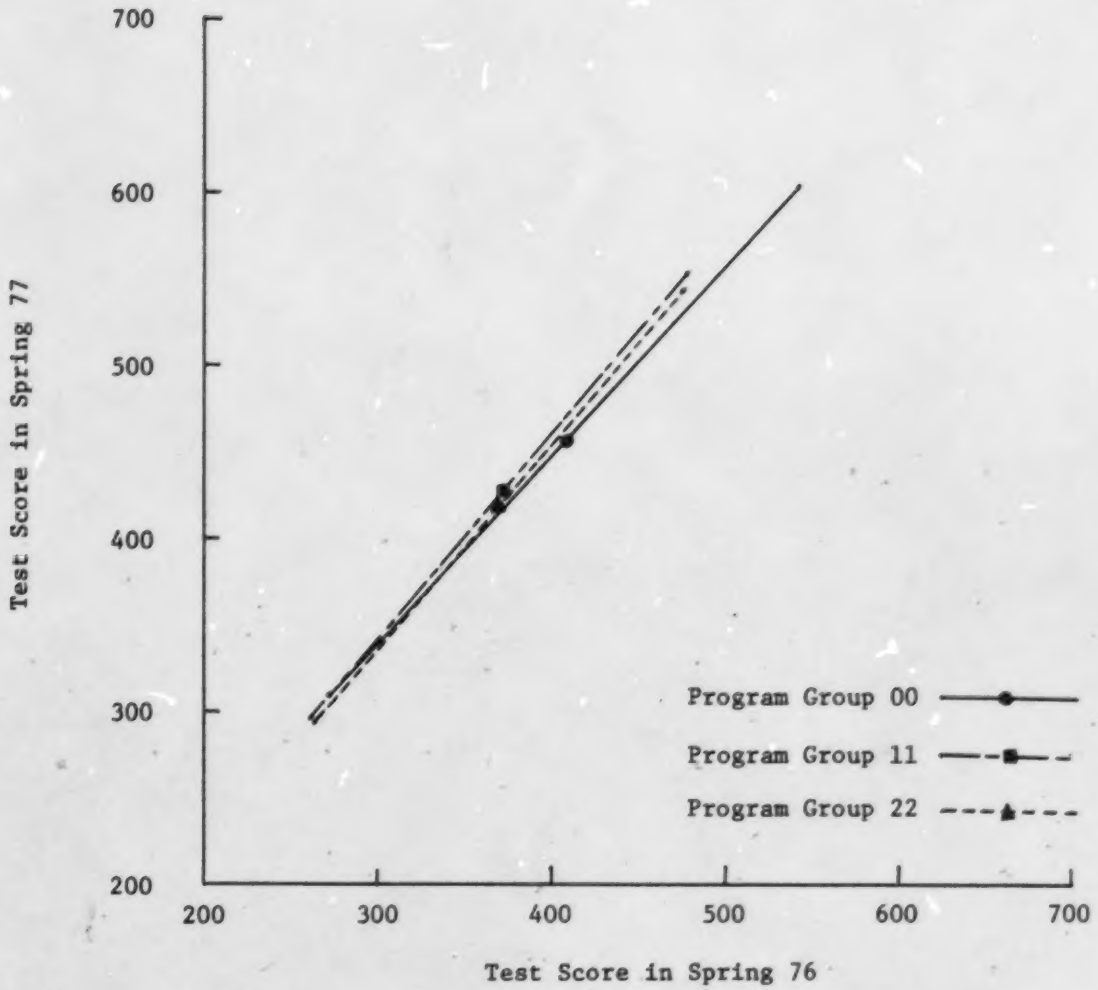

Figure 11. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 5 after One Year

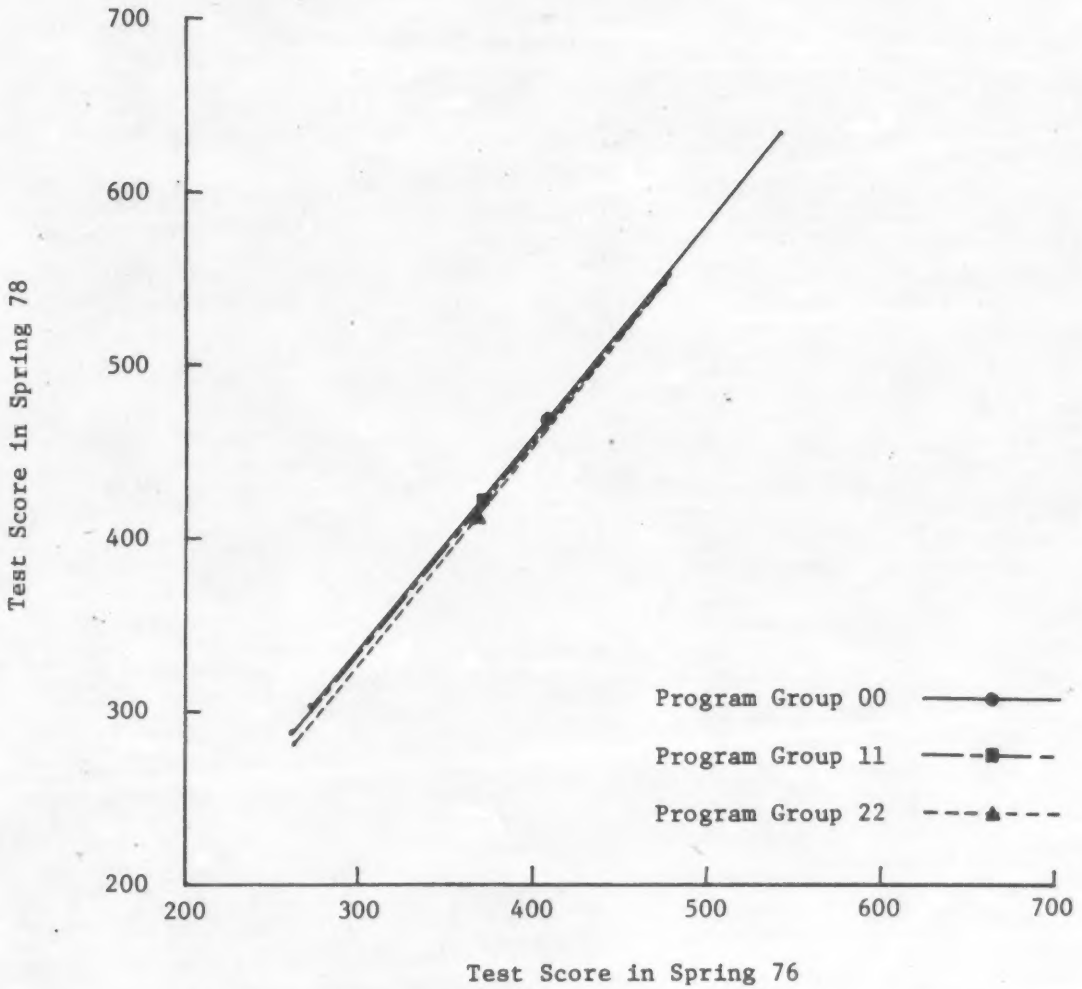

Figure 12. Diagonal Lines and Mean Math Scores for Three Program Groups in Cohort 5 after Two Years

IOWA TESTING PROGRAMS

OCCASIONAL PAPERS

1. Coffman, William E. Moratorium? What Kind? (ED 099 408)

2. Coffman, William E., & Mathews, Walter M. Narrative Reports and the Iowa Tests of Basic Skills.

3. Forsyth, Robert A., & Feldt, Leonard S. On the Validity of the I.T.E.D. as an Aid in Program Evaluation. (ED 142 558)

4. Gulliksen, Harold O. Applications of Psychological Scaling Methods.

5. Lee, Lai-Min Paul, & Coffman, William E. A Study of the "I Don't Know" Response in Multiple-Choice Tests. (ED 141 371)

6. Novick, Melvin R. A Course in Bayesian Statistics. (out of print) (In: American Statistician, May 1975, Vol. 29, No. 2, pp. 94-98)

7. Hood, Joyce, Leslie, Lauren, & Kendall, Janet Ross. Instructional Effectiveness in Primary Grade Reading: A Pilot Study.

8. Petersen, Nancy S., & Novick, Melvin R. An Evaluation of Some Models for Test Bias. (out of print) (In: Journal of Educational Measurement, Spring 1976, Vol. 13, No. 1, pp. 3-31)

9. Kendall, Janet Ross, & Hood, Joyce. Instructional Practices and Easy-to-Change Surrounding Conditions Variables in Effective Primary Reading Programs. (ED 123 557)

10. Petersen, Nancy S. An Expected Utility Model for "Optimal" Selection. (out of print) (In: Journal of Educational Statistics, Winter 1976, Vol. 1, No. 4, pp. 333-358)

11. Lindley, D. V. The Effect of Ethical Design Considerations on Statistical Analysis.

12. Lindley, D. V. A Class of Utility Functions. (In: Annals of Statistics, Vol. 4, No. 1, January 1976)

13. Lindley, D. V. Probability and Medical Diagnosis; and The Role of Utility in Decision-Making.

14. Lindley, D. V. Inference for a Bernoulli Process: A Bayesian View; and The Future of Statistics: A Bayesian 21st Century.

15. Shigemasu, Kazuo. Development and Validation of a Simplified M-Group Regression Model. (In: Journal of Educational Statistics, Summer 1976, Vol. 1, No. 2, pp. 157-180)

16. Cantor, Gordon N. Sex and Race Effects in the Community Behavior of Upper-Elementary-School-Aged Children. (ED 115 658)

17. Forsyth, Robert A. Describing What Johnny Can Do.

18. Sedere, M. U., & Feldt, Leonard S. The Sampling Distribution of the Kristof Reliability Coefficient, the Feldt Coefficient, and Guttman's λ_2. (In: Journal of Educational Measurement, Spring 1977, Vol. 14, No. 1, pp. 53-62)

19. Coffman, William E. Those Achievement Tests - What For?

20. Hunt, David E. Teachers are Psychologists, Too: On the Applications of Psychology to Education. (Ed 129 651)

21. Johnson, Sylvia T. Self-Concept in a School Setting: Construct Validations by Factor Analysis. (ED 142 573)

22. Coffman, William E., & Shigemasu, Kazuo. Appraising School Effectiveness Using a Bayesian Method. (ED 159 220)

23. Coffman, William E. Classical Test Development Solutions. (ED 175 913)

24. Olsen, Scott A. An Investigation of Possible Test Floor Effects by Comparing Score Distributions for Students Tested with Two Different Levels of a Test Battery at Four Different Times over a Two-Year Interval. (ED 175 914)

25. Haebara, Tomokazu. A Method for Investigating Item Bias Using Birnbaum's Three-Parameter Logistic Model.